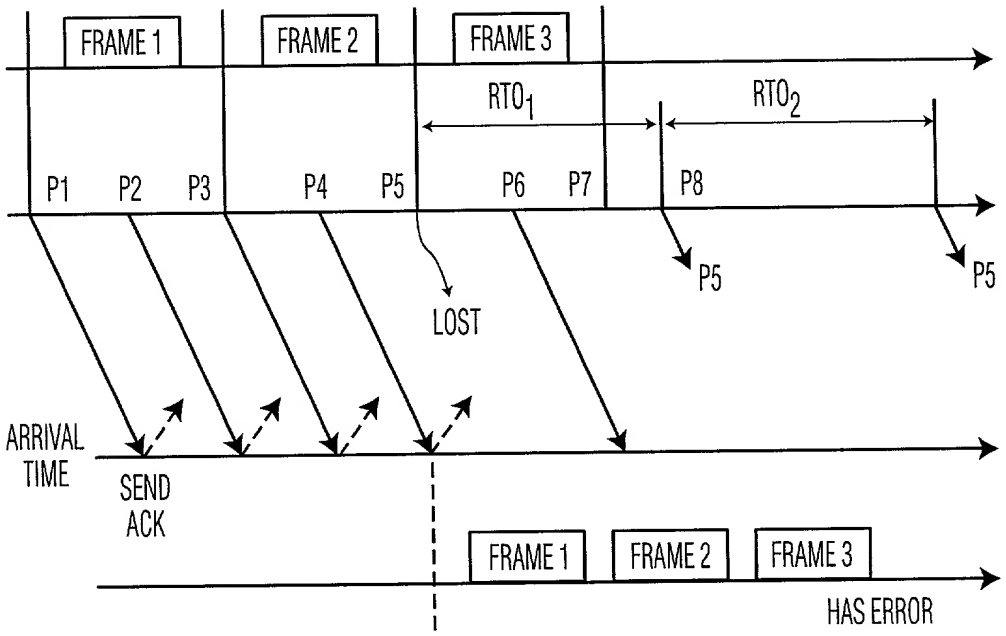
FRAME 1
FRAME 2
FRAME 3
RTO1
RTO2
P1
P2
P3
P4
P5
P6
P7
P8
P5
P5
LOST
ARRIVAL TIME
SEND ACK
FRAME 1
FRAME 2
FRAME 3
HAS ERROR

FIG. 1(a)

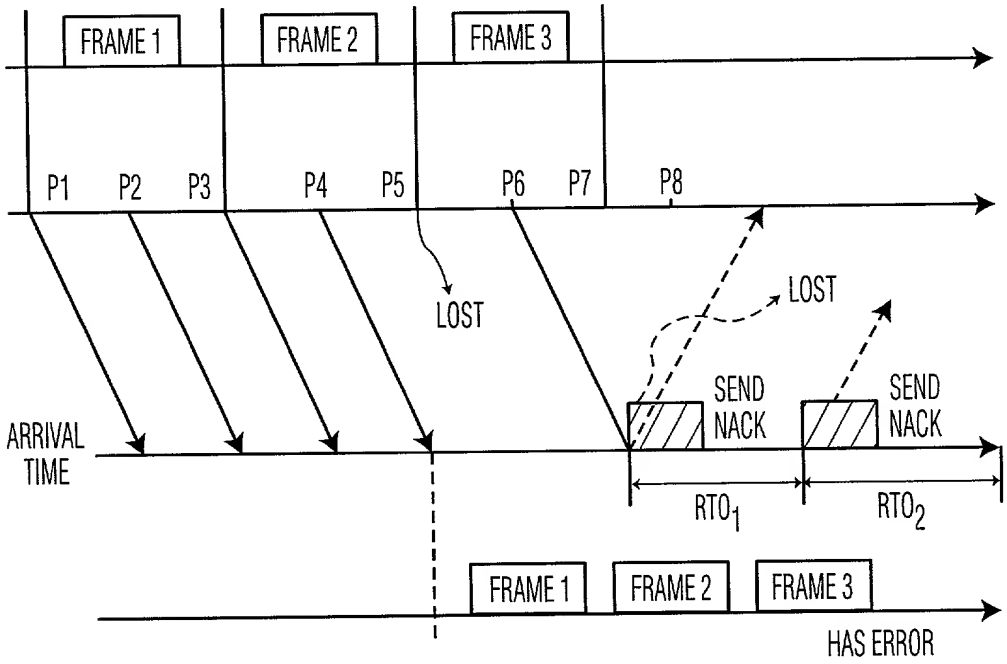
FRAME 1
FRAME 2
FRAME 3
P1
P2
P3
P4
P5
P6
P7
P8
LOST
LOST
SEND NACK
SEND NACK
ARRIVAL TIME
RTO1
RTO2
FRAME 1
FRAME 2
FRAME 3
HAS ERROR

FIG. 1(b)

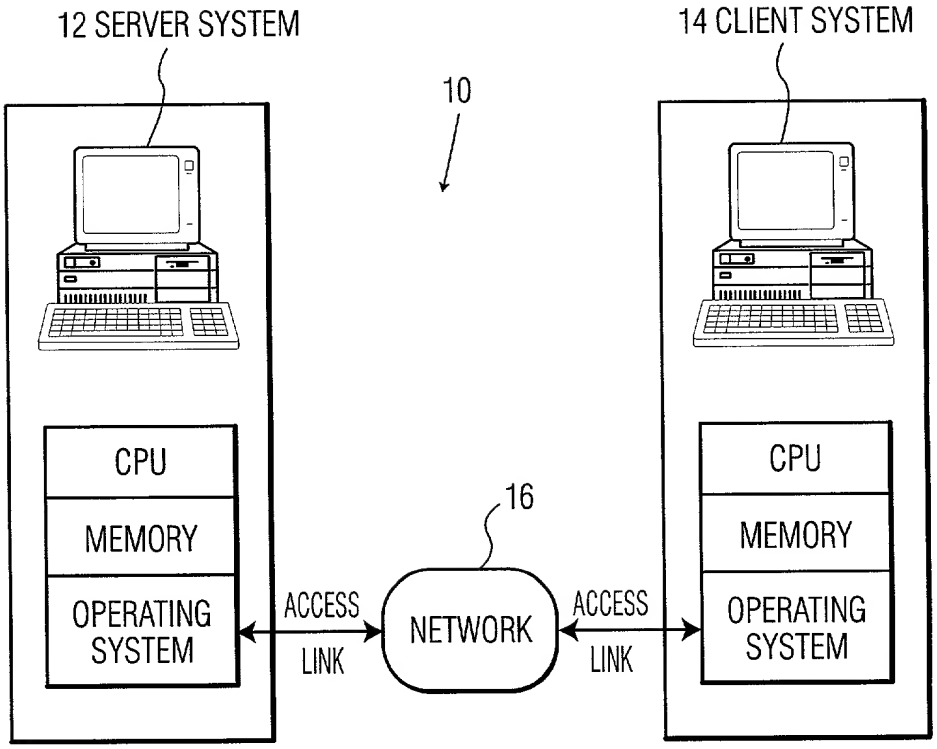
12 SERVER SYSTEM
14 CLIENT SYSTEM
10
CPU
MEMORY
OPERATING SYSTEM
16
ACCESS LINK
NETWORK
ACCESS LINK
CPU
MEMORY
OPERATING SYSTEM

FIG. 2

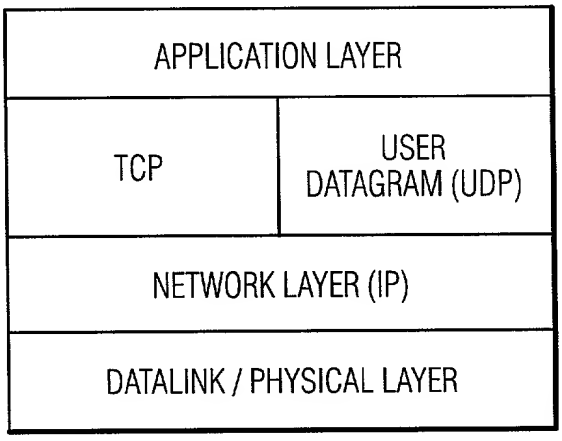
APPLICATION LAYER
TCP
USER DATAGRAM (UDP)
NETWORK LAYER (IP)
DATALINK / PHYSICAL LAYER

FIG. 3

UDP HEADER	
PACKET SEQUENCE # (m)	BURST # (j)
RETRANSMISSION COUNT	
DATA PAYLOAD	

FIG. 4(a)

UDP HEADER	
PACKET SEQ. #	RETX COUNT

FIG. 4(b)

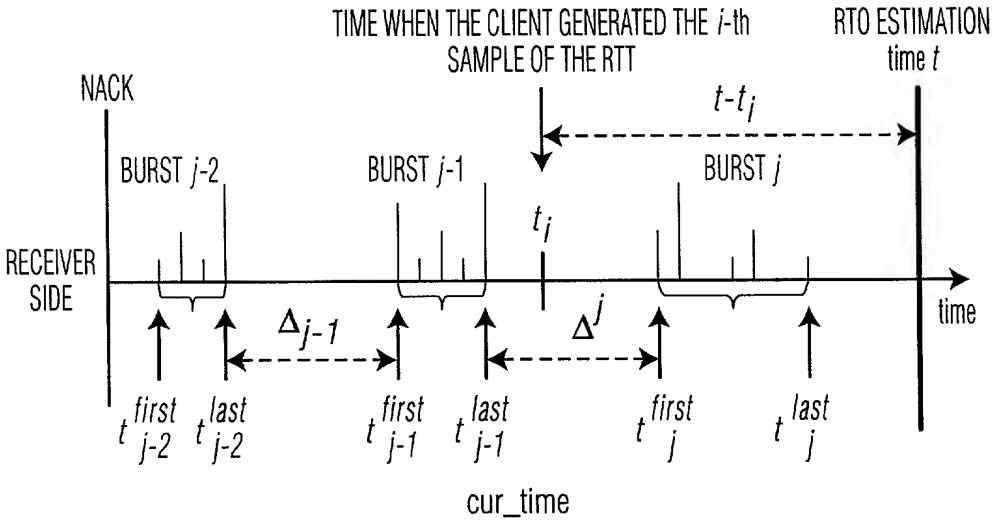

FIG. 5

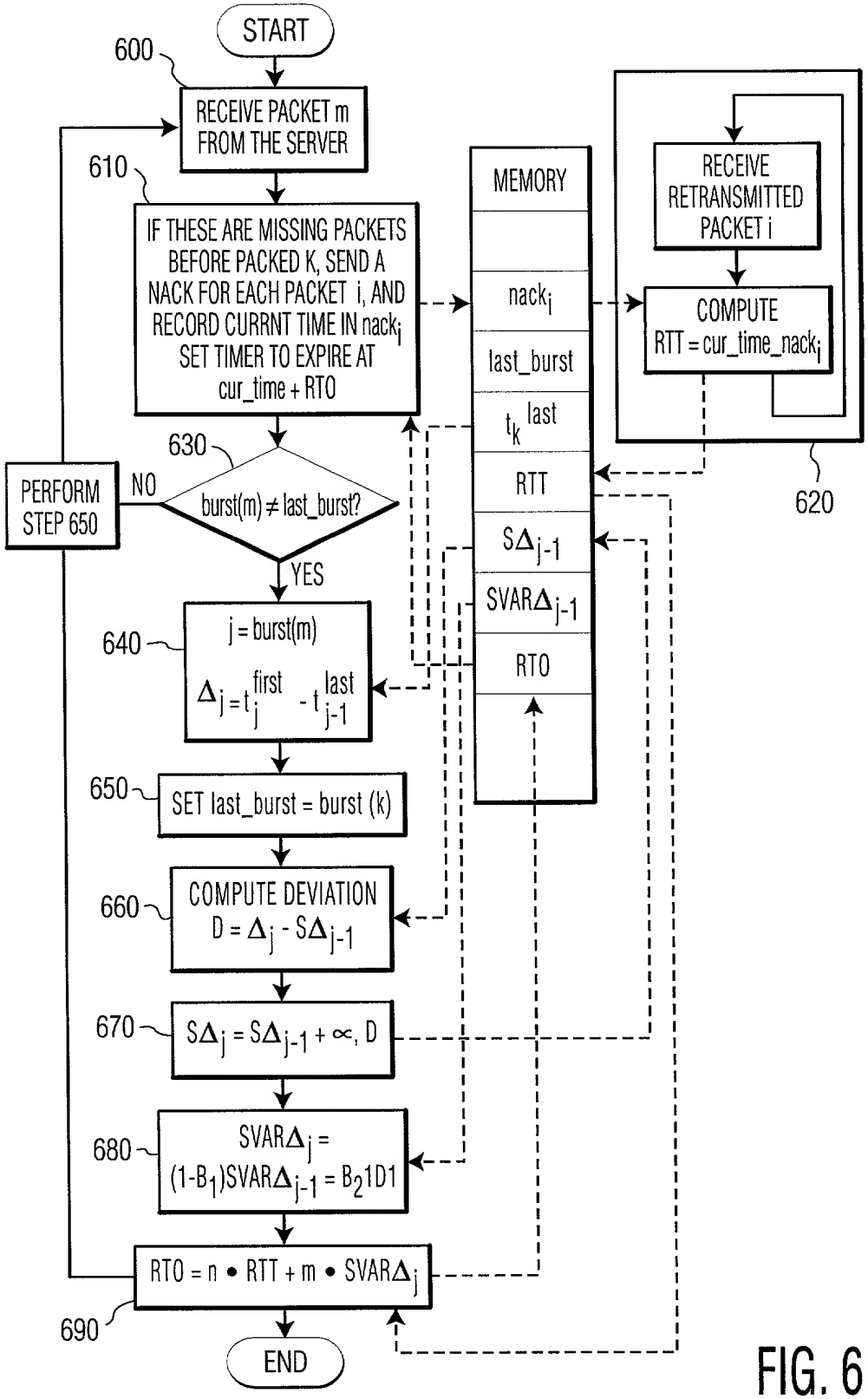
START
600
RECEIVE PACKET m FROM THE SERVER
610
IF THESE ARE MISSING PACKETS BEFORE PACKED K, SEND A NACK FOR EACH PACKET i, AND RECORD CURRNT TIME IN $nack_i$ SET TIMER TO EXPIRE AT cur_time + RTO
630
burst(m) ≠ last_burst?
NO
PERFORM STEP 650
YES
640
j = burst(m)
$\Delta_j = t_j^{first} - t_{j-1}^{last}$
650
SET last_burst = burst (k)
660
COMPUTE DEVIATION
$D = \Delta_j - S\Delta_{j-1}$
670
$S\Delta_j = S\Delta_{j-1} + \alpha, D$
680
$SVAR\Delta_j = (1-B_1)SVAR\Delta_{j-1} = B_2 1D1$
690
$RTO = n \bullet RTT + m \bullet SVAR\Delta_j$
END
MEMORY
$nack_i$
last_burst
t_k^{last}
RTT
$S\Delta_{j-1}$
$SVAR\Delta_{j-1}$
RTO
RECEIVE RETRANSMITTED PACKET i
COMPUTE
$RTT = cur_time - nack_i$
620

FIG. 6